

*REMARKS/ARGUMENTS**The Pending Claims*

Claims 17-22, 25-29, 38, 39, and 41-64 currently are pending. Claims 54-57 and 61-64 have been withdrawn in response to a restriction requirement. As such, claims 17-22, 25-29, 38, 39, 41-53 and 58-60 currently are subject to examination. With respect to claims that have been withdrawn, upon allowance of one or more elected claims, Applicants request rejoinder of the withdrawn claims dependent on, or otherwise containing the limitations of, an allowed claim.

*Amendments to the Claims*

The claims have been amended to point out more particularly and claim more distinctly the present invention. Claim 17 has been amended merely to specify that the method comprises two steps, namely, (a) administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus to an animal, and (b) eliciting a protective immune response to a West Nile Virus in the animal. Similarly, claim 38 has been amended to specify that the method comprises (a) administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus comprising at least one attenuating mutation to an animal, and (b) eliciting an immune response to at least another flavivirus in the animal.

No new matter has been added by way of these amendments.

*Summary of the Office Action*

Claims 17-22, 25-29, 38, 39, 41-43, and 58-60 have been rejected under 35 U.S.C. § 102(a) or 102(e) as allegedly anticipated by International Patent Application No. WO 2003/046189 (“the ‘189 publication”). Claims 17, 18, 20-22, and 25 have been rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Khromykh et al., *J. Virol.*, 75: 4633-4640 (2001). Claims 17-22, 25-29, 38, 39, 41-43, and 58-60 have been rejected under 35 U.S.C. § 103(a) as allegedly obvious over Khromykh et al. in view of Hall et al., *Virology*, 264: 66-75 (1999). Reconsideration of these rejections is respectfully requested in view of the amendments and remarks herein.

*Examiner Interview*

Applicants thank Examiner Boesen for the courtesies extended to the undersigned representative in the telephone interview that took place on August 24, 2010. The claim amendments and remarks set forth herein reflect the discussion during the Examiner interview.

*Discussion of Claim Construction*

The anticipation and obviousness rejections arise from the Office's view that the clause "thereby eliciting a protective immune response to a West Nile Virus in the animal," recited in claim 17, and the clause "thereby eliciting an immune response to at least another flavivirus in the animal," recited in claim 38, are non-limiting since, according to the Examiner, the aforementioned clauses "express the intended result of the claimed method" (see pages 4-6 of the Office Action dated February 25, 2010).

The Office has cited *Texas Instruments, Inc. v. International Trade Comm.*, 988 F.2d 1165, 1171, 26 U.S.P.Q.2d 1018, 1023 (Fed Cir. 1993), and *Minton v. National Assoc. of Securities Dealers, Inc.*, 336 F.3d 1373, 1381, 67 U.S.P.Q.2d 1614, 1620 (Fed. Cir. 2003), in support of the Office's assertion that the "thereby clauses" recited in the claims are not considered to be limiting. Accordingly, the Office's interpretation of claims 17 and 38, and claims dependent thereon, is that the only positive method step for determining patentability of the invention recited in the pending claims is "administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus" (see pages 4-6 of the Office Action dated February 25, 2010).

Applicants respectfully submit that the Office has applied an improper and overly broad interpretation of claims 17 and 38 that has resulted in improper rejections under Sections 102 and 103. Specifically, the Federal Circuit has held that, in contrast to the "whereby" clauses at issue in *Texas Instruments* and *Minton*, when a "whereby" clause states a condition that is material to patentability, it cannot be ignored in order to change the substance of the invention. *Hoffer v. Microsoft Corp.*, 405 F.3d 1326, 1329, 74 U.S.P.Q.2d 1481, 1483 (Fed. Cir. 2005). This is particularly true when the specification indicates that the claimed element recited in the "whereby" clause is an integral part of the invention. *Id.* 405 F.3d at 1330, 74 U.S.P.Q.2d at 1483-84. Thus, the Federal Circuit affirmed the district

court's holding that the "whereby" clause cannot be construed in a manner such that the construction of the claim is "contrary to the fundamental invention." *Id.*

The specification of the present application is replete with disclosures which confirm that the clauses "thereby eliciting a protective immune response to a West Nile Virus in the animal," and "thereby eliciting an immune response to at least another flavivirus in the animal," are not merely the intended results of the claimed method, but rather, are integral parts of the invention recited in the pending claims (see, e.g., page 4, lines 7, through page 5, line 2). In particular, the "Summary of the Invention" clearly discloses that the invention is directed to the use of an infectious flavivirus to protectively immunize against at least one other flavivirus (see page 2 at lines 2-5 and lines 12-15, and page 3 at lines 4-5). Thus, Applicants respectfully submit that, contrary to the assertions of the Office, the aforementioned "thereby" clauses are more than an intended result of a method step, they are fundamental to the claimed invention. Therefore, it is improper for the Office to simply discount the "thereby" clauses recited in pending claims 17 and 38 as being immaterial to the patentability of the invention recited in the pending claims.

The wording of claims 17 and 38 was discussed during the Examiner Interview that took place on August 24, 2010, and the Examiner indicated that the "thereby" clauses recited in claims 17 and 38 would be considered as claim limitations if each of the clauses were re-written as a positive method step. Therefore, solely in an effort to advance prosecution of the instant application, and not in acquiescence of the rejection, the "thereby" clauses recited in independent claims 17 and 38 have been re-written as positive method steps (i.e., step (b)).

In view of the foregoing, Applicants submit that step (b) recited in amended claim 17 and step (b) recited in amended claim 38 are conditions that are material to the patentability of the invention recited in the pending claims, and, therefore, the Office must consider these steps as claim limitations.

#### *Discussion of the Anticipation Rejections*

Claims 17-22, 25-29, 38, 39, 41-43, and 58-60 have been rejected as allegedly anticipated by the '189 publication. Claims 17, 18, 20-22, and 25 have been rejected as allegedly anticipated by Khromykh et al. Applicants traverse these rejections for the reasons set forth below.

Neither the ‘189 publication nor Khromykh et al. discloses or suggests the essential features of the invention recited in the pending claims. In other words, neither Khromykh et al. nor the ‘189 publication discloses or suggests (i) a method comprising (a) administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus to an animal, and (b) eliciting a protective immune response to a West Nile Virus in the animal, or (ii) a method comprising (a) administering an isolated nucleic acid encoding an infectious attenuated Kunjin virus comprising at least one attenuating mutation to an animal, and (b) eliciting an immune response to at least another flavivirus in the animal, as recited in the pending claims. Rather, both the ‘189 publication and Khromykh et al. are completely silent on whether an isolated nucleic acid encoding a Kunjin virus is useful for eliciting a protective immune response to at least another flavivirus, much less a West Nile Virus, as recited in the pending claims.

In view of the foregoing, the rejections under Section 102 are improper and should be withdrawn.

*Discussion of the Obviousness Rejection*

Claims 17-22, 25-29, 38, 39, 41-43, and 58-60 have been rejected as allegedly obvious over Khromykh et al. in view of Hall et al. Applicants traverse this rejection for the reasons set forth below.

The present invention provides the first ever report of protective immunization by administration of a DNA copy of a flavivirus genome, and, more particularly, immunization by a non-pathogenic flavivirus genome (Kunjin) against a far more virulent and pathogenic flavivirus (NY99 strain of West Nile virus) (see the specification at page 4, lines 15-19). Thus, the invention recited in the pending claims is premised on the surprising and unexpected discovery that immunization with an isolated nucleic acid encoding an infectious attenuated Kunjin virus induces an immune response against at least another flavivirus in an animal, and, most surprisingly, confers protective immunity against the more pathogenic West Nile virus (see, e.g., the specification at page 4, lines 7-14).

As discussed above with respect to the anticipation rejections, Khromykh et al. is completely silent on whether an isolated nucleic acid encoding a Kunjin virus is useful for eliciting a protective immune response to at least another flavivirus, as recited in the pending

claims. The Office cites Hall et al. as allegedly disclosing an attenuated Kunjin virus comprising a substitution mutation at proline residue 250 of non-structural protein NS1. However, similar to the disclosure of Khromykh et al., Hall et al. is completely silent on whether an isolated nucleic acid encoding a Kunjin virus is useful for eliciting a protective immune response to at least another flavivirus, as recited in the pending claims. Therefore, even if one of ordinary skill in the art would have decided to modify the Kunjin virus disclosed in Khromykh et al. to include a substitution mutation at proline residue 250 of non-structural protein NS1, as disclosed in Hall et al., one of ordinary skill in the art could not have reasonably known or predicted that the aforementioned virus would be useful for eliciting a protective immune response against at least another flavivirus, as recited in the pending claims.

In view of the failure of the cited references – even in combination – to disclose or reasonably suggest all of the features of the present invention, and the advantageous and unexpected properties of the present invention, the present invention as defined by the pending claims must be considered to have been unobvious in view of the combination of Khromykh et al. and Hall et al. Accordingly, the obviousness rejection should be withdrawn.

### *Conclusion*

Applicants respectfully submit that the patent application is in condition for allowance. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned agent.

Respectfully submitted,



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Date: August 25, 2010